

WO 99/58690

PCT/EP99/03141

1

SEQUENCE LISTING

<110> Hoechst Schering AgrEvo GmbH
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Thr Lys Val Glu Asp Glu Gly Glu Glu Asp Glu Pro Val Ala Glu Asp
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AGG TAC GCG CTC GGC GGC GCG TGC AGG GTG CTC GCC GGA ATG CCC GCG 191
Arg Tyr Ala Leu Gly Gly Ala Cys Arg Val Leu Ala Gly Met Pro Ala
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CCG CTG GGC GCC ACC GCG CTC GCC GGC GGG GTC AAT TTC GCC GTC TAT 239
Pro Leu Gly Ala Thr Ala Leu Ala Gly Gly Val Asn Phe Ala Val Tyr
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TCC GGC GGA GCC ACC GCC GCG GCG CTC TGC CTC TTC ACG CCA GAA GAT 287
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CTC AAG GCG GTGGGGTTGC CTCCCGAGTA GAGTTCATCA GCTTTGCGTG 336
Leu Lys Ala

CGCCGCGCGC CCCTTTTTTG GGCCTGCAAT TTAAGTTTTG TACTGGGGCA AATGCTGCAG 396

GAT AGG GTG ACC GAG GAG GTT CCC CTT GAC CCC CTG ATG AAT CGG ACC 444
Asp Arg Val Thr Glu Glu Val Pro Leu Asp Pro Leu Met Asn Arg Thr
1 5 10 15

GGG AAC GTG TGG CAT GTC TTC ATC GAA GGC GAG CTG CAC AAC ATG CTT 492
Gly Asn Val Trp His Val Phe Ile Glu Gly Glu Leu His Asn Met Leu
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Tyr Gly Tyr Arg Phe Asp Gly Thr Phe Ala Pro His Cys Gly His Tyr

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Leu Asp Val Ser Asn Val Val Val Asp Pro Tyr Ala Lys Ala Val Ile			
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Ser Arg Gly Glu Tyr Gly Val Pro Ala Arg Gly Asn Asn Cys Trp Pro			
65	70	75	80
CAG ATG GCT GGC ATG ATC CCT CTT CCA TAT AGC ACG TTT GAT TGG GAA			684
Gln Met Ala Gly Met Ile Pro Leu Pro Tyr Ser Thr Phe Asp Trp Glu			
85	90	95	
GGC GAC CTA CCT CTA AGA TAT CCT CAA AAG GAC CTG GTA ATA TAT GAG			732
Gly Asp Leu Pro Leu Arg Tyr Pro Gln Lys Asp Leu Val Ile Tyr Glu			
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Met His Leu Arg Gly Phe Thr Lys His Asp Ser Ser Asn Val Glu His			
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Thr Ile Asn Phe Phe Ser Pro Met Thr Arg Tyr Thr Ser Gly Glu Ile			
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Ile Leu Val Leu Arg Pro Asp Val * Glu Thr Asn Ile Tyr Ser Lys			
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 Tyr Ala Leu Gly Gly Ala Cys Arg Val Leu Ala Gly Met Pro Ala Pro
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 Leu Gly Ala Thr Ala Leu Ala Gly Gly Val Asn Phe Ala Val Tyr Ser
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 Gly Gly Ala Thr Ala Ala Ala Leu Cys Leu Phe Thr Pro Glu Asp Leu
 85 90 95
 Lys Ala Asp Arg Val Thr Glu Glu Val Pro Leu Asp Pro Leu Met Asn
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 Arg Thr Gly Asn Val Trp His Val Phe Ile Glu Gly Glu Leu His Asn
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Tyr	Glu	Met	His	Leu	Arg	Gly	Phe	Thr	Lys	His	Asp	Ser	Ser	Asn	Val		
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 Asp Met Ile Ser Asn Asp Pro Ile Leu Gly Gly Val Lys Leu Ile Ala
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 Gln Phe Ile Lys Gly Thr Asp Gly Phe Ala Gly Gly Phe Ala Glu Cys
 485 490 495
 Leu Cys Gly Ser Pro His Leu Tyr Gln Ala Gly Gly Arg Lys Pro Trp
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 545 550 555 560
 Glu Phe Ala Arg Leu Ser Val Lys Arg Leu Arg Lys Arg Gln Met Arg
 565 570 575
 Asn Phe Phe Val Cys Leu Met Val Ser Gln Gly Val Pro Met Phe Tyr
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 595 600 605
 Cys His Asp Ser Tyr Val Asn Tyr Phe Arg Trp Asp Lys Lys Glu Gln
 610 615 620
 Tyr Ser Glu Leu His Arg Phe Cys Cys Leu Met Thr Lys Phe Arg Lys
 625 630 635 640
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 645 650 655
 Gln Trp His Gly His Gln Pro Gly Lys Pro Asp Trp Ser Glu Asn Ser
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 Arg Phe Val Ala Phe Ser Met Lys Asp Glu Arg Gln Gly Glu Ile Tyr
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Pro Tyr Asp Phe Leu Thr Asp Asp Leu Pro Asp Arg Ala Leu Thr Ile
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99

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TAC TCC GGC GGA GCC ACA GCC GCG GCG CTC TGC CTC TTC ACG CCA GAA Tyr Ser Gly Gly Ala Thr Ala Ala Ala Leu Cys Leu Phe Thr Pro Glu 80 85 90			291
GAT CTC AAG GCG GAT AGG GTG ACG GAG GAG GTT CCC CTT GAC CCC CTG Asp Leu Lys Ala Asp Arg Val Thr Glu Glu Val Pro Leu Asp Pro Leu 95 100 105			339
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CAG GAC ATG CTT TAC GGG TAC AGG TTC GAC GGC ACC TTT GCT CCT CAC Gln Asp Met Leu Tyr Gly Tyr Arg Phe Asp Gly Thr Phe Ala Pro His 125 130 135 140			435
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225	230	235	
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GAG TTC AAC GAG CTG GAG TAC TCA ACC TCT TCT TCC AAG ATG AAC TTT Glu Phe Asn Glu Leu Glu Tyr Ser Thr Ser Ser Ser Lys Met Asn Phe 255 260 265			819
TGG GGA TAT TCT ACC ATA AAC TTC TTT TCA CCA ATG ACG AGA TAC ACA Trp Gly Tyr Ser Thr Ile Asn Phe Phe Ser Pro Met Thr Arg Tyr Thr 270 275 280			867
TCA GGC GGG ATA AAA AAC TGT GGG CGT GAT GCC ATA AAT GAG TTC AAA Ser Gly Gly Ile Lys Asn Cys Gly Arg Asp Ala Ile Asn Glu Phe Lys 285 290 295 300			915
ACT TTT GTA AGA GAG GCT CAC AAA CGG GGA ATT GAG GTG ATC CTG GAT Thr Phe Val Arg Glu Ala His Lys Arg Gly Ile Glu Val Ile Leu Asp 305 310 315			963
GTT GTC TTC AAC CAT ACA GCT GAG GGT AAT GAG AAT GGT CCA ATA TTA Val Val Phe Asn His Thr Ala Glu Gly Asn Glu Asn Gly Pro Ile Leu 320 325 330			1011
TCA TTT AGG GGG GTC GAT AAT ACT ACA TAC TAT ATG CTT GCA CCC AAG Ser Phe Arg Gly Val Asp Asn Thr Thr Tyr Tyr Met Leu Ala Pro Lys 335 340 345			1059
GGA GAG TTT TAT AAC TAT TCT GGC TGT GGG AAT ACC TTC AAC TGT AAT Gly Glu Phe Tyr Asn Tyr Ser Gly Cys Gly Asn Thr Phe Asn Cys Asn 350 355 360			1107
CAT CCT GTG GTT CGT CAA TTC ATT GTA GAT TGT TTA AGA TAC TGG GTG His Pro Val Val Arg Gln Phe Ile Val Asp Cys Leu Arg Tyr Trp Val 365 370 375 380			1155
ACG GAA ATG CAT GTT GAT GGT TTT CGT TTT GAT CTT GCA TCC ATA ATG Thr Glu Met His Val Asp Gly Phe Arg Phe Asp Leu Ala Ser Ile Met 385 390 395			1203
ACC AGA GGT TCC AGT CTG TGG GAT CCA GTT AAC GTG TAT GGA GCT CCA Thr Arg Gly Ser Ser Leu Trp Asp Pro Val Asn Val Tyr Gly Ala Pro 400 405 410			1251
ATA GAA GGT GAC ATG ATC ACA ACA GGG ACA CCT CTT GTT ACT CCA CCA Ile Glu Gly Asp Met Ile Thr Thr Gly Thr Pro Leu Val Thr Pro Pro 415 420 425			1299
CTT ATT GAC ATG ATC AGC AAT GAC CCA ATT CTT GGA GGC GTC AAG CTC Leu Ile Asp Met Ile Ser Asn Asp Pro Ile Leu Gly Gly Val Lys Leu			1347

430	435	440	
GTT GCT GAA GCA TGG GAT GCA GGA GGC CTC TAT CAA GTA GGT CAA TTC Val Ala Glu Ala Trp Asp Ala Gly Gly Leu Tyr Gln Val Gly Gln Phe 445 450 455 460			1395
CCT CAC TGG AAT GTT TGG TCT GAG TGG AAT GGG AAG TAC CGG GAC ATT Pro His Trp Asn Val Trp Ser Glu Trp Asn Gly Lys Tyr Arg Asp Ile 465 470 475			1443
GTG CGT CAA TTC ATT AAA GGC ACT GAT GGA TTT GCT GGT GGT TTT GCC Val Arg Gln Phe Ile Lys Gly Thr Asp Gly Phe Ala Gly Gly Phe Ala 480 485 490			1491
GAA TGT CTT TGT GGA AGT CCA CAC CTA TAC CAG GCA GGA GGA AGG AAA Glu Cys Leu Cys Gly Ser Pro His Leu Tyr Gln Ala Gly Gly Arg Lys 495 500 505			1539
CCT TGG CAC AGT ATC AAC TTT GTA TGT GCA CAC GAT GGA TTT ACA CTG Pro Trp His Ser Ile Asn Phe Val Cys Ala His Asp Gly Phe Thr Leu 510 515 520			1587
GCT GAT TTG GTA ACA TAT AAT AAC AAG TAC AAT TTA CCA AAT GGG GAG Ala Asp Leu Val Thr Tyr Asn Asn Lys Tyr Asn Leu Pro Asn Gly Glu 525 530 535 540			1635
AAC AAC AGA GAT GGA GAA AAT CAC AAT CTT AGC TGG AAT TGT GGG GAG Asn Asn Arg Asp Gly Glu Asn His Asn Leu Ser Trp Asn Cys Gly Glu 545 550 555			1683
GAA GGA GAA TTC GCA AGA TTG TCT GTC AAA AGA TTG AGG AAG AGG CAG Glu Gly Glu Phe Ala Arg Leu Ser Val Lys Arg Leu Arg Lys Arg Gln 560 565 570			1731
ATG CGC AAT TTC TTT GTT TGT CTC ATG GTT TCT CAA GGA GTT CCA ATG Met Arg Asn Phe Phe Val Cys Leu Met Val Ser Gln Gly Val Pro Met 575 580 585			1779
TTC TAC ATG GGT GAT GAA TAT GGC CAC ACA AAA GGG GGC AAC AAC AAT Phe Tyr Met Gly Asp Glu Tyr Gly His Thr Lys Gly Gly Asn Asn Asn 590 595 600			1827
ACA TAC TGC CAT GAT TCT TAT GTC AAT TAT TTT CGC TGG GAT AAA AAA Thr Tyr Cys His Asp Ser Tyr Val Asn Tyr Phe Arg Trp Asp Lys Lys 605 610 615 620			1875
GAA CAA TAC TCT GAC TTG CAC CGA TTC TGT TGC CTC ATG ACC AAA TTC Glu Gln Tyr Ser Asp Leu His Arg Phe Cys Cys Leu Met Thr Lys Phe 625 630 635			1923
CGC AAG GAG TGC GAG GGT CTT GGC CTT GAG GAT TTT CCA ACG GCC GAA Arg Lys Glu Cys Glu Gly Leu Gly Leu Glu Asp Phe Pro Thr Ala Glu			1971

640	645	650	
CGG CTG CAG TGG CAT GGT CAT CAG CCT GGG AAG CCT GAT TGG TCT GAG Arg Leu Gln Trp His Gly His Gln Pro Gly Lys Pro Asp Trp Ser Glu 655 660 665			2019
AAT AGC CGA TTC GTT GCC TTT TCC ATG AAA GAT GAA AGA CAG GGC GAG Asn Ser Arg Phe Val Ala Phe Ser Met Lys Asp Glu Arg Gln Gly Glu 670 675 680			2067
ATC TAT GTG GCC TTC AAC ACC AGC CAC TTA CCG GCC GTT GTT GAG CTC Ile Tyr Val Ala Phe Asn Thr Ser His Leu Pro Ala Val Val Glu Leu 685 690 695 700			2115
CCG GAG CGC ACA GGG CGC CGG TGG GAA CCG GTG GTG GAC ACA GGC AAG Pro Glu Arg Thr Gly Arg Arg Trp Glu Pro Val Val Asp Thr Gly Lys 705 710 715			2163
CCA GCA CCA TAC GAC TTC CTC ACT GAC GAC TTA CCT GAT CGC GCT CTC Pro Ala Pro Tyr Asp Phe Leu Thr Asp Asp Leu Pro Asp Arg Ala Leu 720 725 730			2211
ACC ATA CAC CAG TTC TCT CAT TTC CTC AAC TCC AAC CTC TAC CCC ATG Thr Ile His Gln Phe Ser His Phe Leu Asn Ser Asn Leu Tyr Pro Met 735 740 745			2259
CTC AGC TAC TCA TCG GTC ATC CTA GTA TTG CGC CCT GAT GTT TGAGAGGCGG Leu Ser Tyr Ser Ser Val Ile Leu Val Leu Arg Pro Asp Val 750 755 760			2311
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Glu Asp Glu Gly Glu Glu Asp Glu Pro Val Ala Glu Asp Arg Tyr Ala 35 40 45			

Leu Gly Gly Ala Cys Arg Val Leu Ala Gly Met Pro Thr Pro Leu Gly
 50 55 60

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 85 90 95

Asp Arg Val Thr Glu Glu Val Pro Leu Asp Pro Leu Met Asn Arg Thr
 100 105 110

Gly Asn Val Trp His Val Phe Ile Glu Gly Glu Leu Gln Asp Met Leu
 115 120 125

Tyr Gly Tyr Arg Phe Asp Gly Thr Phe Ala Pro His Cys Gly His Tyr
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Leu Asp Val Ser Asn Val Val Val Asp Pro Tyr Ala Lys Ala Val Ile
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Ser Arg Gly Glu Tyr Gly Val Pro Ala Arg Gly Asn Asn Cys Trp Pro
 165 170 175

Gln Met Ala Gly Met Ile Pro Leu Pro Tyr Ser Thr Phe Asp Trp Glu
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Gly Asp Leu Pro Leu Arg Tyr Pro Gln Lys Asp Leu Val Ile Tyr Glu
 195 200 205

Met His Leu Arg Gly Phe Thr Lys His Asp Ser Ser Asn Val Glu His
 210 215 220

Pro Gly Thr Phe Ile Gly Ala Val Ser Lys Leu Asp Tyr Leu Lys Glu
 225 230 235 240

Leu Gly Val Asn Cys Ile Glu Leu Met Pro Cys His Glu Phe Asn Glu
 245 250 255

Leu Glu Tyr Ser Thr Ser Ser Ser Lys Met Asn Phe Trp Gly Tyr Ser
 260 265 270

Thr Ile Asn Phe Phe Ser Pro Met Thr Arg Tyr Thr Ser Gly Gly Ile
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Lys Asn Cys Gly Arg Asp Ala Ile Asn Glu Phe Lys Thr Phe Val Arg
 290 295 300

Glu Ala His Lys Arg Gly Ile Glu Val Ile Leu Asp Val Val Phe Asn
 305 310 315 320

His Thr Ala Glu Gly Asn Glu Asn Gly Pro Ile Leu Ser Phe Arg Gly
 325 330 335

Val	Asp	Asn	Thr	Thr	Tyr	Tyr	Met	Leu	Ala	Pro	Lys	Gly	Glu	Phe	Tyr	340	345	350	
Asn	Tyr	Ser	Gly	Cys	Gly	Asn	Thr	Phe	Asn	Cys	Asn	His	Pro	Val	Val	355	360	365	
Arg	Gln	Phe	Ile	Val	Asp	Cys	Leu	Arg	Tyr	Trp	Val	Thr	Glu	Met	His	370	375	380	
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Ser	Leu	Trp	Asp	Pro	Val	Asn	Val	Tyr	Gly	Ala	Pro	Ile	Glu	Gly	Asp	405	410	415	
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Ile	Ser	Asn	Asp	Pro	Ile	Leu	Gly	Gly	Val	Lys	Leu	Val	Ala	Glu	Ala	435	440	445	
Trp	Asp	Ala	Gly	Gly	Leu	Tyr	Gln	Val	Gly	Gln	Phe	Pro	His	Trp	Asn	450	455	460	
Val	Trp	Ser	Glu	Trp	Asn	Gly	Lys	Tyr	Arg	Asp	Ile	Val	Arg	Gln	Phe	465	470	475	480
Ile	Lys	Gly	Thr	Asp	Gly	Phe	Ala	Gly	Gly	Phe	Ala	Glu	Cys	Leu	Cys	485	490	495	
Gly	Ser	Pro	His	Leu	Tyr	Gln	Ala	Gly	Gly	Arg	Lys	Pro	Trp	His	Ser	500	505	510	
Ile	Asn	Phe	Val	Cys	Ala	His	Asp	Gly	Phe	Thr	Leu	Ala	Asp	Leu	Val	515	520	525	
Thr	Tyr	Asn	Asn	Lys	Tyr	Asn	Leu	Pro	Asn	Gly	Glu	Asn	Asn	Arg	Asp	530	535	540	
Gly	Glu	Asn	His	Asn	Leu	Ser	Trp	Asn	Cys	Gly	Glu	Glu	Gly	Glu	Phe	545	550	555	560
Ala	Arg	Leu	Ser	Val	Lys	Arg	Leu	Arg	Lys	Arg	Gln	Met	Arg	Asn	Phe	565	570	575	
Phe	Val	Cys	Leu	Met	Val	Ser	Gln	Gly	Val	Pro	Met	Phe	Tyr	Met	Gly	580	585	590	
Asp	Glu	Tyr	Gly	His	Thr	Lys	Gly	Gly	Asn	Asn	Asn	Thr	Tyr	Cys	His	595	600	605	
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Glu Gly Leu Gly Leu Glu Asp Phe Pro Thr Ala Glu Arg Leu Gln Trp
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His Gly His Gln Pro Gly Lys Pro Asp Trp Ser Glu Asn Ser Arg Phe
660 665 670

Val Ala Phe Ser Met Lys Asp Glu Arg Gln Gly Glu Ile Tyr Val Ala
675 680 685

Phe Asn Thr Ser His Leu Pro Ala Val Val Glu Leu Pro Glu Arg Thr
690 695 700

Gly Arg Arg Trp Glu Pro Val Val Asp Thr Gly Lys Pro Ala Pro Tyr
705 710 715 720

Asp Phe Leu Thr Asp Asp Leu Pro Asp Arg Ala Leu Thr Ile His Gln
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